REMARKS

Claims 1-14 were examined and rejected. Applicants amend claims 1, 4-5, 7, 9-10 and 14 and submit that no new matter is added therein. Specifically, amendments to claim 1 are supported at least at paragraphs 15-17 and Figures 4-6; amendments to claim 4 are supported at least at paragraphs 16-17 and Figures 5-6; amendments to claim 9 are supported at least at paragraphs 16-17 and Figures 5-6; amendments to claim 10 are supported similar to those of claim 4; and amendments to claim 14 are supported at least by paragraphs 15-17 and Figures 4-5 of the Application as originally filed. Applicants submit additional claims 17 and 18 and submit that no new matter is added therein as claim 17 is supported at least at paragraph 14; and claim 18 is supported at least at paragraphs 16 and Figures 5 of the Application as originally filed. Applicants cancel claims 6 and 16. Thus, Applicants respectfully request consideration of claims 1-5 and 7-14 as amended, and consideration of additional claims 17-18, in view of at least the following remarks.

A. 35 U.S.C. §103(a): Rejection of Claims 1-7, 9-12, 14

The Patent Office rejects claims 1-7, 9-12, 14 under 35 U.S.C. §103(a) as obvious over U.S. Patent Application No. 2003/0013233 of Shibata et al. (Shibata) in combination with U.S. Patent Application No. 2002/0031899 of Manor (Manor) in combination with U.S. Patent Application No. 2004/0014253 of Gupta et al. (Gupta).

Shibata is cited for disclosing a method of forming a chemically soluble coating on a plurality of exposed contacts, removing portions of the coating, sawing along a scribe street to form individual die, removing and sawing simultaneously, and removing the entire coating in a scribe street region, and exposing a plurality of contacts by removing an entire portion of coating above the contact. Gupta is cited for teaching a chemical etch results in dissolution. Manor is cited for a scribing method

using a laser.

Independent claim 1 is not obvious over the cited references, because the cited references do not teach a method including forming a chemically soluble coating on a plurality of exposed contacts on a surface of a circuit substrate and on the surface to a thickness greater than a distance of surface protrusion of a portion of the plurality of contacts, then scribing through the substrate along scribe areas, wherein scribing comprises using a laser and generating debris on the coating, and after scribing, removing the coating by a dissolution process to remove the debris, and to expose the plurality of contacts and the surface.

In Figures 1(a)-1(e), Shibata describes forming scribe lines (see paragraph 28 and Fig. 1(a)), forming a resin layer 3 over contacts 2, forming cut grooves 4 in resin 3 and into wafer 1 (see Fig 1(c)), then removing a portion of the thickness of resin layer 3 (see Fig. 1(e)), and then sawing completely through the substrate to dice the substrate (see paragraph 34 and Fig. 1(f)). Moreover, Shibata teaches removing resin layer 3 by a chemical process such as etching or a physical process such as grinding (see paragraph 15).

Addressing the Examiner's position that although Shibata is silent as to how scribe lines are formed, it teaches a wafer cut along its scribe lines after formation of the scribe lines, and thus motivates use of a cut groove along scribe lines where a scribe line is expressly needed prior to the cut. Shibata does not teach or suggest forming a chemical soluble coating on contacts and a surface, and then scribing using a laser, as required by amended claim 1. Instead, Shibata teaches scribing using a laser (see Fig. 1(a) and paragraph 28) and then, coating (see Fig. 1 (b) and paragraph 29).

In addition, Shibata does not teach wherein scribing comprises using a laser and generating debris on the coating as required by amended claim 1. Instead, Shibata teaches that layer 3 does not exist during the scribing of Shibata.

Similarly, Shibata does not teach removing the coating to remove the debris as

required by amended claim 1. Instead, Shibata teaches that the debris from scribing is not on the coating because Shibata teaches scribing before forming the coating.

Moreover, Shibata does not teach removing the coating to expose the contacts and the surface of the substrate, as required by amended claim 1. Specifically, the principle of operation of Shibata is that a portion of the thickness of resin layer 3 exists at all times so that a thickness of wafer 1 can be ground down (see paragraph 33 and Fig. 1(c)-1(d) where wafer 1 includes layer 3), and finally diced (see paragraph 34 and Fig. 1(e)-1(f) where chip 5 includes a thickness of layer 3), to produce semiconductor package chip 5 having a thickness fully reduced for which "no further packaging is required for the semiconductor chip 5" (see paragraph 39 and Fig. 1(f) where chip 5 includes a thickness of layer 3). Thus, Shibata teaches away from removing the coating to expose the contacts and the surface of the substrate, as required by amended claim 1.

In addition, neither Gupta nor Manor provide any teaching or motivation for the method limitations described above for amended claim 1.

Hence, since none of the references teach any of the limitations of claim 1 noted above, Applicants respectfully request the Patent Office withdraw the rejection above.

Moreover, Applicants assert that the combination of Shibata with Gupta to teach removing the coating to expose the contacts and the surface of the substrate, as required by amended claim 1, is improper. Instead, as noted above, the principle of operation of Shibata teaches away from such combination. For example, without limitation thereto, a practitioner would not be motivated to dissolve layer 3 to expose the surface of the wafer after final dicing because Shibata teaches that "no further packaging is required for the semiconductor chip 5" (see paragraph 39 and Fig. 1(f) where chip 5 includes a thickness of layer 3). Hence, Applicants respectfully request the Patent Office withdraw the rejection above of claim 1 because Shibata cannot be properly combined with Gupta to teach removing the layer 3 to expose the contacts and the surface of the substrate, as required by amended claim 1.

In addition, Applicants assert that the combination of Shibata with Manor to teach scribing with a laser at paragraph 34 of Shibata is improper. As noted above, Shibata teaches forming scribe lines at boundaries between individual semiconductor devices, on the surface 1a of wafer 1, as shown by arrow A in Fig. 1(a) (see paragraph 28 and Fig. 1(a)). However, at paragraph 34, Shibata teaches dicing using a dicing blade, but does not teach scribing using a laser (see paragraph 34). Moreover, paragraph 29 and Fig. 1(c) Shibata teaches forming cut grooves 4 using a dicing blade or dicing saw. Thus, a practitioner would find no motivation in either reference for scribing with a laser in addition to that of paragraph 28 and Fig. 1(a) of Shibata. Specifically, additional scribing is not suggested and would be superfluous. Hence, for this additional reason that Shibata cannot be properly combined with Manor, Applicants respectfully request the Patent Office withdraw the rejection above of claim 1.

In addition to being dependent upon allowable claim 1 as argued above, Applicants assert that claim 4 is patentable over the cited references for at least the reason that the references do not teach or suggest sawing with a saw, completely through the substrate along the scribed areas prior to or simultaneously with removing the coating, as required by amended claim 4.

As noted above, Shibata describes removing a portion of the thickness of the coating (see Fig. 1(e)) and then, sawing completely through the substrate (see Fig. 1(f)) after the thickness of the coating is removed. Moreover, as described above, the principle of operation of Shibata is that a thickness of the resin layer remains during final dicing so that wafer 1 can be subject to a grinding process (Fig. 1(d)) to be planar or have an even thickness (see paragraph 35) because wafer 1 is reinforced in its entirety by resin layer 3 (see paragraph 36), and the ground down or thinned wafer will be reinforced by the remaining thickness of layer 3 during handling and dicing (see paragraph 37).

Moreover, Gupta and Manor similarly do not provide any teaching or motivation for the above noted limitations of amended dependent claim 4.

Hence, for at least the reason that the cited references do not teach or suggest sawing with a saw, completely through the substrate prior to or simultaneously with removing the coating, Applicants respectfully request the Patent Office withdraw the rejection of claim 4.

Independent claim 9 is not obvious over the cited references, because the references do not teach or provide any motivation for a method comprising forming a coating comprising a chemically soluble material on the exposed contacts and on the surface to a thickness on the surface that is greater than a distance of surface protrusion of a portion of the plurality of contacts; then scribing through the substrate along the scribe streets using a laser; and after scribing, removing the coating from an area on the contacts and removing the coating thickness from the surface by a water dissolution process, as required by claim 9.

Some of the arguments above with respect to claim 1 and 4 apply here as well. Specifically, Shibata does not teach or suggest removing layer 3 from the surface of the substrate 1, such as required by claim 9. Instead, it is the principle of operation of Shibata that some of the thickness of layer 3 exists on chip 5 through final dicing so that no further packaging is required (see paragraphs 34 and 39). Moreover, Shibata does not teach forming a coating and then scribing using a laser, such as required by claim 9. Instead, Shibata teaches scribing and then forming layer 3 (see Figures 1a and 1b).

Moreover, Shibata does not teach removing the coating thickness from the surface of the substrate by a water dissolution process, as required by claim 9. As mentioned above, Shibata teaches removing a portion of the thickness of layer 3 but does not teach removing all of the coating thickness from the surface, as required by claim 9. Shibata teaches removing a portion of the thickness of layer 3 either by etching or by grinding, but does not teach water, dissolution, or that layer 3 is dissolvable by water.

In addition, neither Gupta nor Manor provide any teaching or motivation for the method limitations described above for amended claim 9.

Moreover, as noted above, the combination of Shibata with Gupta is improper to teach removing the coating thickness from the surface of the substrate by a water dissolution process, as required by claim 9. For example, Shibata teaches that resin layer 3 may be a polyimide or epoxy (see paragraph 29), and that a thickness of layer 3 will remain as part of chip 5 after it has been mounted on a board (see paragraph 39). However, there is no suggestion or motivation in either reference for using a photoresist layer, such as that of Gupta, in place of the polyimide or epoxy of Shibata.

Thus, the cited references do not teach or suggest removing the coating by a water dissolution process, as required by amended claim 9.

In addition, as noted above, Applicants submit that the combination of Shibata and Manor is improper to teach or suggest scribing using a laser after forming a chemically soluble coating.

Hence, for at least the reasons above, Applicants respectfully request that the Patent Office withdraw the rejection above of amended claim 9.

Claim 14 is not obvious over the cited references, because the cited references do not teach or provide any motivation for a method comprising coating a surface of a circuit substrate comprising a plurality of exposed contacts with a chemically soluble material; then scribing the surface of the substrate along scribe areas, wherein scribing comprises using a laser and generating debris on the coating; removing the coating to remove the debris, and to expose the plurality of contacts by removing all of the coating during a dissolution process; and sawing completely the substrate in the scribe areas, wherein sawing is done using a saw, one of prior to and simultaneously with removing the coating, as required by claim 14.

Some of the arguments above with respect to claim 1, 4 and 9 apply here as well. Specifically, as noted above for claim 1, the cited references do not teach or suggest coating a surface and then scribing the surface using a laser, as required by claim 14. In addition, as noted above for claim 1, the cited references do not teach or suggest wherein scribing comprises using a laser and generating debris on the coating, as required by claim 14. Similarly, as noted above for claim 1, the cited references do not teach or suggest removing the coating to remove the debris, as required by claim 14. Finally, as noted above for claim 4, the cited references do not teach or suggest sawing completely through the substrate using a saw one of prior to and simultaneously with removing the coating, as required by claim 14.

Next, similarly to as noted above for claim 1 regarding exposing the substrate surface, the cited references do not teach or suggest removing all of the coating by a dissolution process, as required by claim 14. Instead, Shibata teaches a principle of operation of final dicing after removing a portion of the thickness of the coating so that no further packaging is needed for chip 5 (see paragraph 39 and Figures 1e and 1f).

In addition, neither Gupta nor Manor provide any teaching or motivation for the method limitations described above for amended claim 14.

Moreover, as noted above, with respect to claim 1 and 9, the combination of Shibata with Gupta is improper to teach the above noted limitations, as required by claim 14.

In addition, as noted above, with respect to claim 1 and 9, Applicants submit that the combination of Shibata and Manor is improper to teach the above noted limitations, as required by claim 14.

Hence, for at least these reasons, Applicants respectfully request the Patent Office withdraw the rejection above of claim 14.

Next, in addition to being dependent on claims 1 and 9 respectively, Applicants submit that dependent claims 7 and 12 respectively are patentable over the cited references for at least the reason that the cited references do not teach removing the entire coating. As noted, Shibata teaches the principle of operation of removing only a portion of the thickness of the coating so that the reduced thickness wafer 5 can be produced and no further packaging is required (e.g., see Figure 1f showing wafer 5 including a portion of thickness of layer 3 and paragraphs 37-39).

Each dependent claim is submitted as not being obvious for at least the same reasons given in support of its base claim, in addition to the further non-obvious limitation added by each dependent claim. Hence, for at least those reasons, Applicants respectfully request the Patent Office withdraw the rejection above for the dependent claims.

Next, for claim 3, Applicants traverse that a thickness between 5-35 microns would be obvious and request the Patent Office cite a reference in support of that position in accordance with MPEP § 2144.03. Specifically, Shibata teaches electrodes 2 having a height of 50 microns (see paragraph 0028).

For at least the reasons noted above, Applicants respectfully request that the Patent Office withdraw the rejection to claims 1-5, 9-12, 14 and 15 under 35 U.S.C. §103(a).

B. 35 U.S.C. §103(a): Rejection of Claims 8, 13

The Patent Office rejects claims 8 and 13 under 35 U.S.C. §103(a) as obvious over Shibata, Gupta and Manor as applied to claims 1 and 9 and further in combination with JP2000630747 of Fuji (Fuji).

Applicants disagree with the rejection above for at least the reasons noted above with respect to Shibata, Gupta and Manor failing to teach or suggest the above-noted limitations of independent claims 1 and 9 from which claims 8 and 13 depend.

Moreover, Fuji fails to cure the shortcomings of those references. Specifically, Fuji is cited for disclosing an epoxy flux. Applicants note that Fuji teaches adding an epoxy flux during soldering. It is not at all clear that an epoxy flux can be substituted for resin layer 3 of Shibata since the resin layer in Shibata is directed at reinforcing a wafer so that the wafer may be thin. See Shibata, paragraph 0013. Regardless, the teachings of Fuji do not cure the defects of the other references, specifically with regard to forming a coating after scribing with a laser, wherein scribing comprises generating debris on the coating, removing the coating to remove the debris, removing the coating to expose a surface of the wafer, or removing the coating using a water dissolution process, as described in claims 1 and 9.

For at least the reasons noted above, Applicants respectfully request the Patent Office withdraw the rejection to claims 8 and 13 under 35 U.S.C. §103(a).

C. **Additional Claims 17-18**

In addition to being dependent upon allowable claim 1 as argued above, Applicants assert that claim 17 is patentable over the cited references for at least the reason that the references do not teach or suggest wherein a material of the coating is an organic coating, as required by claim 17.

In addition to being dependent upon allowable claim 1 as argued above, Applicants assert that claim 18 is patentable over the cited references for at least the reason that the references do not teach or suggest wherein sawing comprises sawing with a saw, completely through the substrate along the scribed areas prior to removing the coating, as required by amended claim 18.

For at least the reasons noted above, Applicants respectfully request the Patent Office allow claims 17-18.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance, and such action is earnestly solicited at the earliest possible date. If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees. If a telephone interview would expedite the prosecution of this Application, the Examiner is invited to contact the undersigned at (310) 207-3800.

Respectfully submitted,

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